

Waxdale Creek  
&  
Related Tributary

Pike River Watershed

Stream Classification

**WATER QUALITY STANDARDS REVIEW  
AND STREAM CLASSIFICATION FOR WAXDALE CREEK  
AND A RELATED TRIBUTARY, PIKE RIVER WATERSHED  
RACINE COUNTY, WISCONSIN  
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## INTRODUCTION

Stream classifications are being developed for reaches of the Pike River and its tributaries which may be affected by implementations of recommendations set forth in SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed (1983). This appraisal contains survey results, an updated stream classification, and other water quality management recommendations for Waxdale Creek and a related tributary.

## BACKGROUND

Waxdale Creek is a first order stream located near the Town of Sturtevant in the Upper Pike River subwatershed in eastern Racine County, Wisconsin. From its source, located at T3N, R22E, S.21, SW¼, NE¼, the stream flows eastward for approximately 1.5 miles before its confluence with the North Branch of the Pike River at T3N, R22E, S.23, NW¼, SW¼. Waxdale Creek drains an area of approximately 2.2 mi<sup>2</sup> and a Q<sub>7,10</sub> of 0 cfs (Bode, 1976). S.C. Johnson and Sons, Waxdale Plant, discharges non-contact cooling water to Waxdale Creek upstream of Willow Road, approximately 0.75 miles upstream of the confluence with the North Branch of the Pike River. The major portion of the flow in waxdale Creek is from the S.C. Johnson and Sons plant. The stream channel has been modified in the past, particularly the reach downstream of S.C. Johnson and Sons to the confluence with the North Branch of the Pike River. Although medium density residential and some major and local industry are currently the dominant land uses in the Waxdale Creek drainage, increased residential and industrial development will have an affect on water quality and biological communities in this stream (SEWRPC, 1983). *Actually, S22 SECE*

The tributary to Waxdale Creek which drains mainly agricultural land, joins Waxdale Creek at T3N, R22E, S.21, SW¼, NW¼. Since surface drainage accounts for the major portion of flow low water levels can be expected during periods of low precipitation. Increased residential and industrial development in the area may lead to increased stormwater drainage to this tributary in the future, a factor which will need to be considered when water use objectives are being developed.

The drainage area of Waxdale Creek and the related tributary lies within soils of the Varna-Elliot-Ashkum and Hebron-Montgomery-Aztalan associations. The Varna-Elliot-Ashkum association is characterized by well-drained to poorly drained soils that have a silty clay loam to clay subsoil. The well-drained or moderately well-drained Varna soils are on ridges and knobs, where the native vegetation was prairie grasses. The somewhat poorly drained Elliot soils and the poorly drained Ashkum soils are in depressions and drainageways, where the native plant cover was water-tolerant grasses. The Hebron-Montgomery-Aztalan association is characterized by well-drained to poorly drained soils that have a loam to silty clay subsoil. The well-drained or moderately well-drained Hebron soils are on hills and knobs while the poorly drained Montgomery soils occupy broad, nearly level areas, where the native plant cover was water-tolerant grasses. The somewhat poorly drained

Aztalan soils lie on flats and in drainageways and depressions. Erosion is a hazard on the Hebron soils, and improved drainage is needed in the Montgomery and Aztalan soils (Link and Demo, 1970). The presence of poorly drained soils in the drainage area has encouraged channelization of streams and the tiling of fields to improve drainage of agricultural lands and minimize flooding of residential properties.

A stream classification was previously developed for Waxdale Creek in 1976 (Bode, 1976).

## METHODS

The stream classifications for Waxdale Creek and its tributary are based on guidelines developed by Ball (1982). Fish community and habitat surveys were completed at two sites on Waxdale Creek and at a single site on the tributary to Waxdale Creek. The site on the tributary to Waxdale Creek was located upstream of CTH H, Racine, at T3N, R22E, S.21, SE¼, NW¼. The first site on Waxdale Creek was located upstream of 90th Street in the Town of Sturtevant at T3N, R22E, S.21, NE¼, SE¼. The second site on Waxdale Creek was located upstream of Willow Road in Racine County at T3N, R22E, S.22, NW¼, SE¼. Fish community samples at all sites were obtained using a DC backpack shocker operating at 150 to 160 volts and 1.15 to 2.2 amps. Sampling efficiency was not estimated for any of the collection stations. An earlier fish community sample was reported by Fago (1984).

## RESULTS

### Habitat

Habitat quality was rated poor at all sites sampled on Waxdale Creek and its tributary. Fish and aquatic life cover at the Waxdale tributary site is provided by overhanging bank vegetation and an occasional woody snag. The substrate consists mainly of silt, sand, and some gravel. Bank vegetation consists primarily of grasses and forbs, with woody vegetation limited to a few shrubs and immature trees. Fish and aquatic life cover on Waxdale Creek at 90th Street is provided by overhanging bank vegetation, woody snags, and scattered rubble/cobble. The substrate consists primarily of silt and sand with small areas of gravel also present. Bank vegetation at this site is generally well-developed and consists of mature trees, shrubs, and residential lawns. Understory vegetation on the wooded right bank is rather sparse, however, making it susceptible to erosion at high flows. At the Willow Road site on Waxdale Creek fish and aquatic life cover is provided exclusively by woody snags. The substrate is dominated by heavy deposits of silt overlying clay hardpan. Bank vegetation consists of mature trees and shrubs but the understory vegetation is very sparse, contributing to erosion at high flows.

Factors and sources responsible for limiting habitat quality include past stream channelization, removal of woody vegetation along the stream channel, sedimentation from nonpoint source pollution, and lack of adequate instream cover.

### Fish Community

A total of four fish species have been collected from Waxdale Creek and the Waxdale tributary since 1975 (Fago, 1984, Bode, 1976). Waxdale Creek and the Waxdale tributary support fish communities consisting of limited numbers of tolerant forage species and a single sport fish species, green sunfish. Although fish habitat in this stream system is less than ideal, it should be adequate to support a fairly

diverse and abundant forage fish community at the very least. Periodic fish kills have been reported on Waxdale Creek and the North Branch of the Pike River downstream of the confluence of Waxdale Creek. Sources or causes of these fish kills have been attributed mainly to chlorine toxicity resulting from discharge of non-contact cooling water from S.C. Johnson and Sons, Inc., although exact causes have not been identified in several cases (WDNR, Southeast District Water Resources Files). The fact that greater numbers of fish were collected in the Waxdale tributary upstream of several industries on Waxdale Creek points to chronic water quality problems in Waxdale Creek as the major cause for low abundance and diversity in this stream reach.

#### Recreational Use

Existing or potential recreational uses for Waxdale Creek and the Waxdale tributary include fishing, wading, bait fish collection, nature study, aesthetics, and others. Recreational use is largely restricted at this time to adjacent landowners due to the lack of public access.

#### SUMMARY

A Stream Classification was completed for Waxdale Creek and the Waxdale tributary in June and July of 1993. Habitat quality was rated poor at all survey sites. Factors and sources responsible for limiting habitat quality include past stream channelization, removal of woody vegetation along the stream channel, sedimentation from nonpoint source pollution, and lack of adequate instream cover. Waxdale Creek and the Waxdale tributary currently support limited fish communities characterized by low total abundance and lack of diversity. Three species totalling 92 individual fish were collected during the fish community surveys in June and July of 1993. Potential factors which may be limiting the fish and aquatic life communities in this stream system include lack of adequate habitat and chronic water quality problems.

## RECOMMENDATIONS

1. Based on the results of the fish community and habitat surveys, Waxdale Creek and the Waxdale tributary shall be classified as **LIMITED FORAGE FISH COMMUNITIES** according to Stream Classification Guidelines for Wisconsin (Ball, 1982).
2. The following land and stream management practices should be implemented to enhance or restore aquatic life and wildlife communities, water quality and recreational uses.
  - a. Prevent future modifications to the stream channel and stream corridor.
  - b. Explore techniques to mitigate the effects of past channel modifications including alternative channel designs and selected habitat improvement methods.
  - c. Protect and restore riparian habitats. Encourage the growth of woody vegetation along the stream channel and corridor to improve bank stability, provide wildlife habitat, and aid in moderating water temperatures through shading of the stream channel.
  - d. Limit future development within the floodplain to protect riparian habitats.
  - e. Implement best management practices to reduce sedimentation from nonpoint sources of pollution.
  - f. Investigate potential sources of fish kills on Waxdale Creek in order to prevent future occurrences.

## REFERENCES

- Ball, Joseph. 1982. Stream Classification Guidelines for Wisconsin. Technical Bulletin. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Bode, Jeff. 1976. Stream Classification and Standards Review for Waxdale Creek and the Pike River. Wisconsin Department of Natural Resources, Southeast District, Milwaukee, Wisconsin.
- Fago, Donald. 1984. Distribution and Relative Abundance of Fishes in Wisconsin. Number IV. Root, Milwaukee, Des Plaines, and Fox River Basins. Technical Bulletin No. 147. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Link, E.G. and O.R. Demo. 1970. Soil Survey of Kenosha and Racine Counties, Wisconsin. United States Department of Agriculture, Soil Conservation Service. Washington, D.C.
- SEWRPC, 1983. A Comprehensive Plan for the Pike River Watershed, Planning Report No. 35.
- Wisconsin Department of Natural Resources, Southeast District, Milwaukee, Wisconsin. Water Resources Fish Kill Investigation Files.





Figure 1. Waxdale Creek at 90th Street, Sturtevant. Starting point for fish assemblage collection. Note the woody bank vegetation at left and evidence of high flows at lower right.



Figure 2. Waxdale Creek at 90th Street, Sturtevant. Note the well-vegetated bank at left and the residential lawns on the right. Banks are relatively stable with the exception of the right bank (at left in photo), which lacks stable understory growth.





Figure 3. Waxdale Creek upstream of Willow Road, Sturtevant. Bank vegetation is well established with the exception of understory growth, which is rather sparse. Substrate in this reach is exclusively composed of silt and muck over clay.



Figure 4. Waxdale tributary at CTH H, Racine County. Beginning of fish assemblage collection station. Bank vegetation dominated by grasses and forbs until upstream end of station, where a few mature trees are present.





Figure 5. Waxdale tributary downstream of CTH H, Racine County. Wetland borders the stream channel along most of this reach. Such 'buffer zones' would be desirable in floodplain management to store large volumes of stormwater before entering the stream channel.